Multicon VX-MOD

VikinX Modular System Controller

User manual

Rev. 0

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Revision history

Current revision of this document is the uppermost in the table below.

Rev.	Repl.	Date	Sign	Change description
0	-	20090702	JIH	First official release

Contents

Revision history 2

1 Product overview 4

2 Specifications 6
2.1 Front view 6
2.2 Rear view 6
2.3 Card specifications 6
2.4 Power connection 7

3 Configuration 8

4 Connections 10
4.1 Control Panel interface 10
4.2 Configuration interface 10
4.3 MBUS interface 10
4.4 Serial connection 10
4.5 Maximum cable length (RS-232) 11
4.6 Ethernet connection 11
4.7 Firewall / VLAN configuration 11
4.8 GPI I/O 12

5 Operation 13

6 Card handling 14
6.1 Status LEDs 14
6.2 How to access the module 14
6.3 Card insertion 15
6.4 Card removal 15
6.5 CF-card and battery 15
6.6 Reset button 16

7 Third-party protocols 17
7.1 Leitch Pass-Through 17
7.2 Pro-bel SW-P-02 17

General environmental requirements for Nevion equipment 20

Product Warranty 21

Appendix A Materials declaration and recycling information 22
A.1 Materials declaration 22
A.2 Recycling information 22

EC Declaration of Conformity 23

1 Product overview

Multicon is the next-generation system controller for VikinX range of routers based on a new open and distributed architecture. The new product offers a range of important improvements for router control. Multicon is also used as the element manager for Flashlink systems enabling deployment of one control system for both VikinX and Flashlink.

In addition, Multicon enables you to control third-party equipment using software plug-ins which makes it one of the industry's most flexible integrated control systems. The product comes with an SDK that is available for selected partners.

Key features and benefits:

- Control of VikinX routing and Flashlink parameters from the same control panels
- Use control panels to control the latest range of Flashlink signal processing & distribution cards
- Define presets for VikinX routing and Flashlink parameters using salvos
- Virtual routers, salvos and mnemonics are processed in the control system; information is updated once and available from anywhere
- Distributed architecture with redundancy; no single point of failure
- Plug-in support for third-party control protocols and control of third-party equipment
- Comes with industry-standard SNMP support for integration with Nevion DataMiner NMS and other third-party NMS solutions

With the new architecture all control data is processed and stored in the Multicon system controller. This means that control data like virtual routers, salvos, mnemonics and parameters may be defined once and efficiently utilized in a number of different control panels, multi-viewers, UMD/tally or automation systems.

The salvo feature provided by Multicon allows you to set multiple VikinX router crosspoints and Flashlink parameters using a single command. It is also possible to create a new salvo by taking a snapshot of the current configuration. This gives you the power to define presets configurations across one or multiple VikinX routers and Flashlink cards.

A key advantage of the new Multicon system controller is the ability to control solutions that combine the power of VikinX routers with Flashlink signal processing cards from one common user interface.

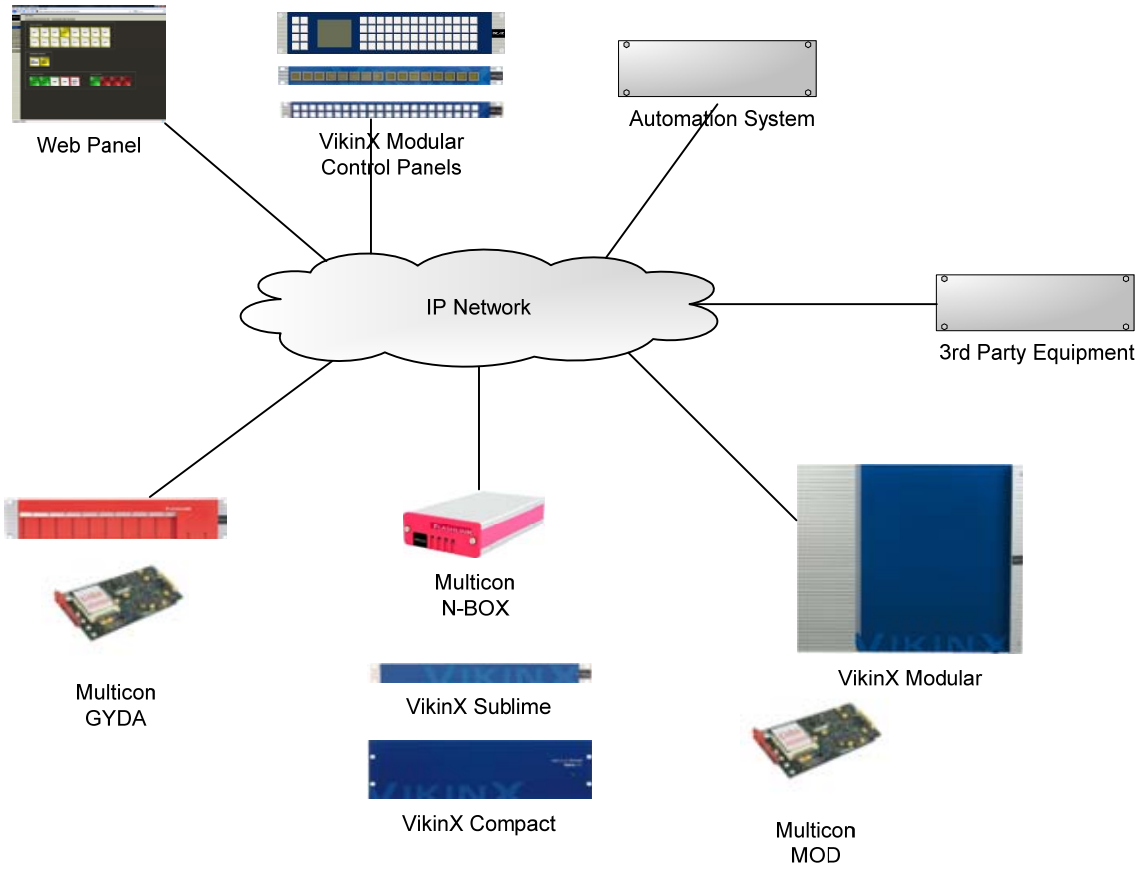

Figure 1: Multicon system overview

The Multicon family consists of the following products:

- Multicon GYDA ONE: Web and SNMP interface for one Flashlink frame
- Multicon GYDA: Web, CP and SNMP interface for up 8 Flashlink frames and 8 attached Sublime/Compact routers
- Multicon N-BOX CP and SNMP interface for up to 32 Sublime/Compact routers
- Multicon PLUS: Multicon N-BOX ordered with Sublime router
- Multicon 2RU: CP and SNMP interface for up to 32 Sublime/Compact routers
- Multicon VX-SLC: CP and SNMP interface for up to 32 Sublime/Compact routers
- Multicon VX-MOD Control system for Modular and up to 8 Sublime/Compact routers

2 Specifications

2.1 Front view

Figure 2: Hardware card front-view

2.2 Rear view

The Multicon VX-MOD backplane connections are available on the VikinX Modular backplane. Please refer the VikinX Modular manual for further information.

The following connectors can be found on the rear of the Multicon:

- **COM1 (RS-232)**: Use this to connect either VikinX Sublime Compact, Compact routers or third party equipment, using RS-232 or RS-422 control protocols.
- **COM2 (RS-422)**: Use this to connect either VikinX Sublime Compact, Compact routers or third party equipment, using RS-232 or RS-422 control protocols.
- **Ethernet 10/100BaseTX**: Use this to connect to an Ethernet switch, using 10/100BaseTX Ethernet protocol, in order to connect to a Multicon system including VinkinX Modular Control Panels.

2.3 Card specifications

CPU	400MHz StrongARM PXA255
Memory	64MB SDRAM 8MB on-board Flash Compact Flash
RS-232/RS-422	2 x RS232 or RS422 DB9F connector

	IBM PC (RS-232) SMPTE 207M (RS-422)
Ethernet	1 x 10BaseT or 100BaseTX Full duplex
Power	+5V DC 3W

2.4 Power connection

The Multicon VX-MOD receives power from the VikinX Modular frame. Please refer to the VikinX Modular manual for further information about power supply units.

3 Configuration

Multicon VX-MOD is used to control VikinX Modular routers but also comes with support for VikinX Sublime, Sublime Compact and Compact routers. In addition, the product may be controlled by or control devices using the Pro-bel SW-P-02 protocol. Optionally it is also possible to extend the protocol support with other third-party protocols.

The following examples show possible ways to use Multicon VX-MOD in combination with VikinX, Flashlink and Pro-bel routers.

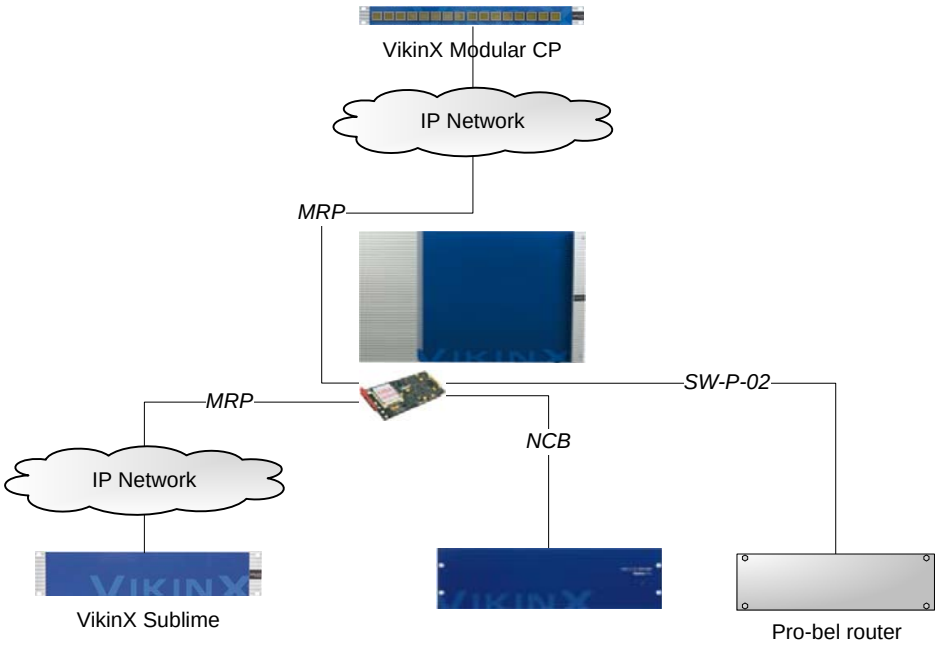

Figure 3: Modular router control

The figure above shows how to use Multicon VX-MOD together with VikinX Sublime, Compact and Pro-bel routers. The Sublime router is connected via TCP/IP (Modular Router Protocol), while the Compact and Pro-bel routers are connected via serial line interface.

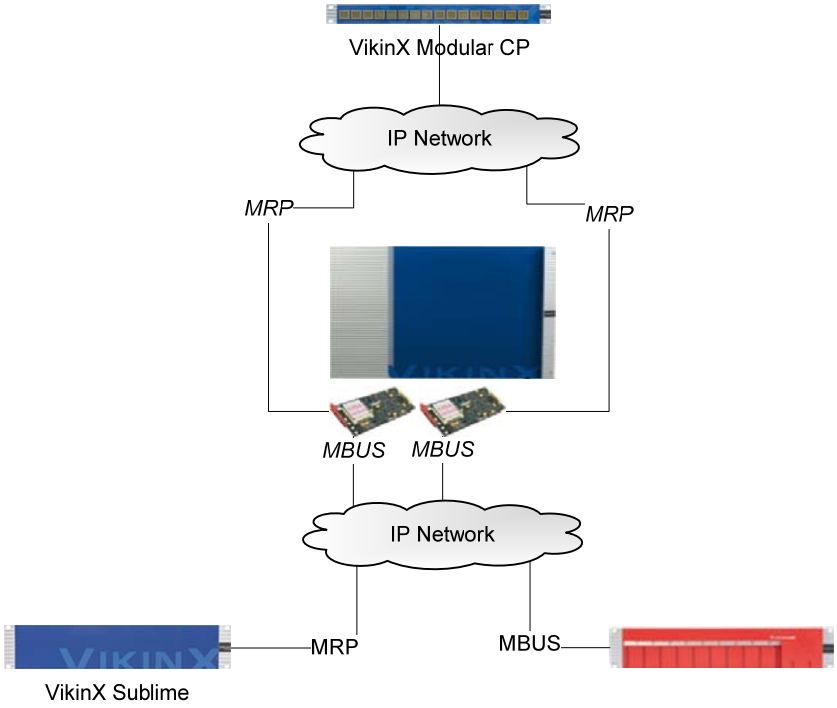

Figure 4: Redundant Multicon controllers

The figure above shows how to use Multicon VX-MOD together with VikinX Sublime and a Flashlink system with Multicon GYDA. The Sublime router is connected via TCP/IP using the Modular Router Protocol, while Multicon GYDA (in the Flashlink frame) is connected via TCP/IP using the MBUS protocol between Multicon controllers.

The two redundant Multicon controllers in the Modular frame have to communicate internally to exchange state information using the MBUS protocol over the external IP network.

Note that redundant Multicon controllers always have to be reachable over an external IP network.

4 Connections

4.1 Control Panel interface

Multicon uses Modular Router Protocol (Nevion proprietary) over TCP/IP for communication with control panels. The protocol is open for third-party integration and the specification is available as a separate manual document.

It is also possible to connect legacy Syscon and ETH-CON controllers that have not been updated with Multicon software using the Modular Router Protocol.

4.2 Configuration interface

Multicon uses Device Configuration Protocol (Nevion proprietary) over TCP/IP for setup of the system. The protocol is only used internally between the System Configurator and Multicon.

4.3 MBUS interface

This product uses software developed by Spread Concepts LLC for use in the Spread toolkit. For more information about Spread see http://www.spread.org.

The MBUS interface (bases on Spread technology) is used for internal communication between Multicon controllers and provides a highly reliable communication mechanism.

4.4 Serial connection

Connection to VikinX Compact routers (or other third-party devices) can be made through the serial port(s) on the Multicon. The communication parameters are configurable. Please refer to the protocol documentation for further details.

Example: The protocol parameters of the VikinX Compact routers are as follows:

- Bit rate 19200 bit/s
- Data bits 8 bits
- Stop bits 1
- Parity: No parity

For further detail concerning this protocol, please refer to the following manual: VikinX Compact Protocol.

The DB9 connectors for the serial port(s) of the router have the following pin-out:

	***COM2 (RS-422)* Female connector**		***COM1 (RS-232)* Male connector**	
Pin #	**RS-232 mode**	**RS-422 mode**	**RS-232 mode**	**RS-422 mode**
1	*Not in use*	*Not in use*	*Not in use*	*Not in use*
2	Tx	Tx -	Rx	Rx +
3	Rx	Rx +	Tx	Tx -
4	*Not in use*	*Not in use*	*Not in use*	*Not in use*
5	GND	GND	GND	GND

6	GND	GND	GND	GND
7	RTS	Tx +	RTS	Tx +
8	CTS	Rx -	CTS	Rx -
9	*Do Not Connect!*	*Do Not Connect!*	*Do Not Connect!*	*Do Not Connect!*

Note that if the standard RS-232 cable specification (DCE) is followed:

- a cable with Male+Male or Female+Female connectors at the cable ends is used for Rx/Tx crossed connection, and
- a cable with Male+Female connectors at the cable ends is used for a straight through connection

4.5 Maximum cable length (RS-232)

IEEE has specified the maximum cable length for an RS-232 connection to 15m. Longer distances can be installed depending on the environmental conditions of the installation site. It is the responsibility of the installer / user to secure a proper installation of the RS-232 connection.

4.6 Ethernet connection

The connections follow the standard set by the IEEE 802.3 100BaseTX specification. The cables that are to be applied should be CAT-5 / CAT-5E standard, or better. It is the responsibility of the installer to secure a proper installation of the Ethernet connection.

All VikinX Modular routers and IP-based Control Panels are connected together through an Ethernet Switch.

For Ethernet protocol details concerning VikinX Modular routers and Multicon, please refer to the following manual: Modular Router Protocol.

4.7 Firewall / VLAN configuration

In order for multiple Multicons and the System Configurator to work, a few select ports **must not** be blocked.

Port	**Type**	**Description**
80	TCP	GYDA Web interface: HTTP traffic from PC workstation to Multicon GYDA.
2800	TCP	Panel configuration: From System Configurator to control panels.
2836	TCP + UDP	MBUS protocol: Primary port for Spread distribution mechanism, from Multicon to Multicon.
2837	TCP + UDP	MBUS protocol: Aux port for Spread, from Multicon to Multicon.

2838	TCP + UDP	MBUS protocol: Aux port for Spread, from Multicon to Multicon.
3972	TCP + UDP	Device Configuration Protocol: From System Configurator to all devices (including Multicon controllers, Sublime routers, control panels)
4381	TCP	Modular Router Protocol: From Multicon to Sublime routers, control panels, legacy Syscon and ETH-CON devices.

In addition, any ports used by third party protocol must of course be open.

4.8 GPI I/O

The output can be used for wiring up alarms for third party control systems. The GPI output is an open collector output, sinking to ground when an alarm is triggered. The GPI connector is shown in figure 7.

The GPI output will be active, if one or more alarms are active in the system.

This means that each GYDA-SC System Controller can monitor the status of e.g. 4 different power supplies. To monitor more than 4 external devices, these must be hardwired together as AND logic.

Pin #	Signal	Name	Mode
1	GPI 1	External alarm 1.	Input
2	GPI 2	External alarm 2.	Input
3	GPI 3	External alarm 3.	Input
4	GPI 4	External alarm 4.	Input
5	Status	General error status for the system.	Open Collector
6		Not in use.	
7	+5V	+5V pin	+5V
8	Ground	0V / GND pin.	0V

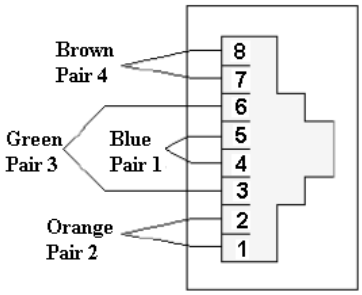

Figure 5: GPI PIN out

5 Operation

Configuration of a Multicon system is performed using the System Configurator tool. Please refer the System Configurator manual for further details.

6 Card handling

6.1 Status LEDs

There are 4 LEDs on the front side of Multicon of the controller card inside the VikinX Modular frame.

Figure 6: LEDs on Multicon controller

The LEDs indicate the following, from *Left to Right*:

Diode / State	**Red LED**	**Yellow LED**	**Green LED**	**No light**
Status	Card error	*Not Applicable*	Overall status of the card is OK	Card has no power, or is not inserted correctly.
Eth	*Not Applicable*	10Mbps connection	100Mbps connection	No Ethernet link established. (Check the cable).
Warn	Abnormal situation: no functional error, but a situation that requires attention.	Boot-load / Startup.	Normal situation	*Not Applicable*
Load	*Not Applicable*	Controller busy	Controller idle	*Not Applicable*

6.2 How to access the module

The active module is accessible through the front of the frame. If service or inspection is required, open the unit from the front.

6.3 Card insertion

The frame is equipped with guide rails to align the controller card into its position. Slide the card into the guide rails inside the box until the card enters the backplane with a slight “click”. The card is locked and proper contact ensured with the blue handle in its downright position.

> Do not use excessive force; the card should enter easily – proper insertion is almost effortless.

6.4 Card removal

To remove a Multicon card, release the card by moving the red handle until it is in horizontal position, and then pull the card out of the frame with the blue handle.

6.5 CF-card and battery

All the information regarding the Multicon configuration, as well as information regarding control panels that are connected to Multicon, is stored in the Compact Flash card on the controller card.

If it is necessary to remove and/or insert a CF card, the following must be done:

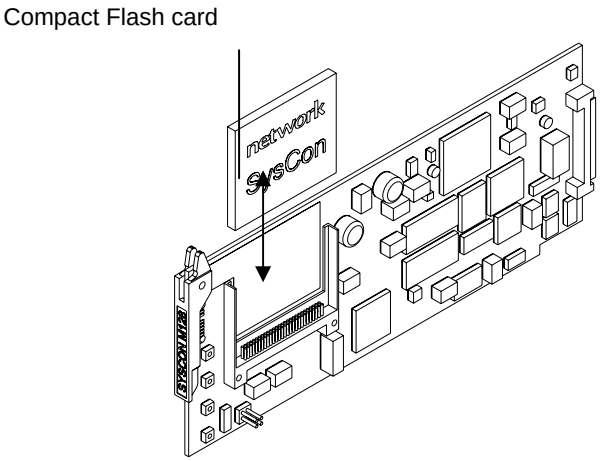

Figure 7: CF card on the controller card.

1. Remove the controller card from its slot, according to the description earlier in this manual.
2. Slide the CF card out of its socket, and insert the new CF card into the socket.
3. Insert the controller card into its slot, according to the description earlier in this manual.

If it is necessary to remove and/or insert a battery, the following must be done:

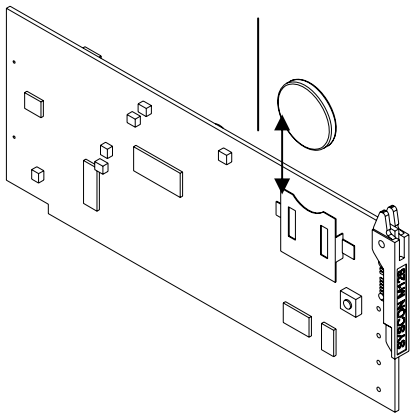

Figure 8: Battery on the controller card.

1. Remove the controller card from its slot, according to the description earlier in this manual.
2. Slide the battery out of its socket, and insert the new battery into the socket.
3. Insert the controller card into its slot, according to the description earlier in this manual.

6.6 Reset button

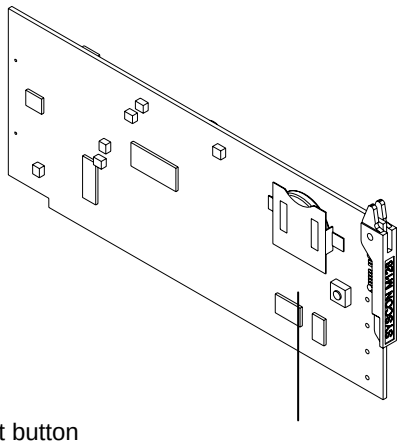

Figure 9: Reset button on the controller card.

The reset button on the rear side is used to perform a hard reset of the card. Do *not* perform a hard reset, unless the situation demands this. By performing a hard reset, the user looses control of the Multicon, and will not get control of Multicon until approximately 20 seconds after releasing the reset button.

7 Third-party protocols

7.1 Leitch Pass-Through

Multicon can be controlled as a Leitch router, but cannot control a Leitch router.

The supported commands can be seen in the table below.

Support	Command Syntax	Command Name	Function
No	@…Q?	ALARMS REQUEST	Requests status of all alarms in system.
No	@…Q?	CLEAR PRESET BUFFER	Clears all presets.
No	@…I?A	DEVICE DESCRIPTION REQUEST	Device information description.
No	@…I?T	DEVICE TYPE REQUEST	Device type information
No	@…I?V	DEVICE VERSION REQUEST	Device version information
Yes	@…X:<Lvls>/<Dest>,<Src>[:I<ID>]	DIRECT CROSSPOINT TAKE	Takes specified crosspoint (specifies source, destination, and level) without buffer execute command.
No	@…!	DISABLE REPORTING	Disables serial port's reporting
No	@…?[<…Time-out>]	ENABLE REPORTING	Enables serial port's reporting of all X-Y messages (including router status)
Yes	@…B:E	EXECUTE PRESET BUFFER	Executes all presets.
Yes	@…F?<Lvl>	FRAME SIZE REQUEST	Requests router size on a specific level.
No	@…W:<Lvl>/<Dest>,<ID>,1	LOCK	Locks specified destination.
Yes	@…P:<Lvl>/<Dest>,<Src>[:I<ID>]	PRESET CROSSPOINT	Presets or preloads crosspoint requests for execution at a later time.
No	@…W:<Lvl>/<Dest>,<ID>,2	PROTECT	Protects specified destination.
Yes	@…S?<Lvl>	REQUEST CROSSPOINT STATUS – ENTIRE LEVEL	Requests crosspoint status of all desti-nations on a specified level.
Yes	@…X?<Lvl><Dest>	REQUEST CROSSPOINT STATUS – SINGLE DESTINATION	Requests crosspoint status of a specific destination on a specific level.
No	@…P?<Lvl><Dest>	REQUEST PRESET CROSSPOINT STATUS	Verifies source that has been preset to a given destination on a specific level.
No	@…P?<Lvl><Dest>	REQUEST PRESET CROSSPOINT STATUS	Verifies source that has been preset to a given destination on a specific level.
No	@…V?<Lvl>	REQUEST PRESET CROSSPOINT STA-TUS ON LEVEL	Verifies source that has been preset to any destination on a given level.
No	@…Z:<Lvls>	RESET LEVELS	Resets specified levels. (On specified levels all destinations return to first source and all locks and protects are removed.)
Yes	@…B:R	RESET PRESET BUFFER	Resets or clears all presets. (Replaced in most products with @…B:C Clear Presets.)
No	@…W:<Lvl>/<Dest>,<ID>,0	UNLOCK	Unlocks specified destination.
No	@…W:<Lvl>/<Dest>,<ID>,0	UNPROTECT	Unprotects specified destination.

7.2 Pro-bel SW-P-02

Multicon can both be controlled by and control third-party routers using the Pro-bel SW-P-02 protocol.

The following subset of SW-P-02 commands are supported.

Support	Command	No	Function
No	DATABASE CHECKSUM REQUEST/RESPONSE	00	
Yes	INTERROGATE	01	Request for tally information.
Yes	CONNECT	02	This message requests a route to be made through the router.
Yes	TALLY	03	This message returns tally information in response to an interrogating device.
Yes	CONNECTED	04	This message is issued by a device after it has made a router through a router, usually in response to a CONNECT request.

Support	Command	No	Function
Yes	CONNECT ON GO	05	Used in Salvo switching situations. Routing information is held in the receiving device until activated by GO command.
Yes	GO	06	Triggers the receiving device to set all routes in/clear the previously received CONNECT ON GO messages.
No	STATUS REQUEST	07	
No	STATUS RESPONSE – 1	08	
No	STATUS RESPONSE – 2	09	
No	STATUS RESPONSE – 3	10	
No	ENABLE CROSSPOINT UPDATE	11	
Yes	CONNECT ON GO ACKNOWLEDGE	12	This message is issued by a device in response to a CONNECT ON GO request.
Yes	GO ACKNOWLEDGE	13	This message is issued by a device in response to a GO message.
No	SOURCE LOCK STATUS REQUEST	14	
No	SOURCE LOCK STATUS RESPONSE	15	
No	STATUS RESPONSE - 4	16	
No	STATUS RESPONSE -5	17	
No	MIXER INTERROGATE	21	
No	MIXER CONNECT	22	
No	MIXER TALLY DUMP	23	
No	MIXER CONNECTED	24	
No	ASSIGN SLOT/SLOT STATUS	25	
No	READ SLOT ASSIGNMENT	26	
No	SET OUTPUT GAIN/ O/P GAIN STATUS	27	
No	READ OUTPUT GAIN	28	
No	READ TWINKLER	29	
No	TWINKLER STATUS	30	
No	INSTALLED MODULES STATUS REQUEST	31	
No	INSTALLED MODULES STATUS RESPONSE -1	32	
No	MIXER DISCONNECTED	33	
No	INSTALLED MODULES STATUS RESPONSE - 3	34	
No	CONNECT ON GO GROUP SALVO	35	
No	GO GROUP SALVO	36	
No	CONNECT ON GO GROUP SALVO ACKNOWLEDGE	37	
No	GO DONE GROUP SALVO ACKNOWLEDGE	38	
No	INSTALLED MODULES STATUS RESPONSE -2	42	
No	ROUTER INPUT/OUTPUT PARAMETERS INTERROGATE	43	
No	ROUTER INPUT/OUTPUT PARAMETERS TALLY	44	
No	ROUTER INPUT/OUTPUT PARAMETERS CONNECT	45	
No	ROUTER INPUT/OUTPUT PARAMETERS CONNECTED	46	
No	DUAL CONTROLLER STATUS REQUEST	50	
No	DUAL CONTROLLER STATUS RESPONSE	51	
No	EXTENDED INTERROGATE	65	
No	EXTENDED CONNECT	66	
No	EXTENDED TALLY	67	
No	EXTENDED CONNECTED	68	
No	EXTENDED CONNECT ON GO	69	
No	EXTENDED CONNECT ON GO ACKNOWLEDGE	70	
No	EXTENDED CONNECT ON GO GROUP SALVO	71	
No	EXTENDED CONNECT ON GO GROUP SALVO ACKNOWLEDGE	72	
No	STATUS DATA REQUEST Message	73	
No	STATUS DATA RESPONSE - 1 Message	74	
No	ROUTER CONFIGURATION REQUEST Message	75	
No	ROUTER CONFIGURATION RESPONSE Message	76	
No	PRO-BEL RESERVED	82	
No	PRO-BEL RESERVED	83	
No	PRO-BEL RESERVED	84	
No	PRO-BEL RESERVED	85	
No	PRO-BEL RESERVED	86	
No	SPECIAL FOR 16X2 (Broadcast Technology)	90-95	
No	Extended PROTECT TALLY	96	

Support	Command	No	Function
No	Extended PROTECT CONNECTED	97	
No	Extended PROTECT DIS-CONNECTED	98	
No	PROTECT DEVICE NAME RESPONSE	99	
No	Extended PROTECT TALLY DUMP	100	
No	Extended PROTECT INTERROGATE	101	
No	Extended PROTECT CONNECT	102	
No	PROTECT DEVICE NAME REQUEST	103	
No	Extended PROTECT DIS-CONNECT	104	
No	Extended PROTECT TALLY DUMP REQUEST	105	
No	X_TALLY_STATUS	124	
No	X_TALLY_INTERROGATE	125	
No	X_TALLY_STATUS_ACKNOWLEDGE	126	
No	X_TALLY_RESPONSE	127	

General environmental requirements for Nevion equipment

1. The equipment will meet the guaranteed performance specification under the following environmental conditions:

- Operating room temperature range: 0°C to 45°C
- Operating relative humidity range: <90% (non-condensing)

2. The equipment will operate without damage under the following environmental conditions:

- Temperature range: -10°C to 55°C
- Relative humidity range: <95% (non-condensing)

Product Warranty

The warranty terms and conditions for the product(s) covered by this manual follow the General Sales Conditions by Nevion, which are available on the company web site:

www.nevion.com

Appendix A Materials declaration and recycling information

A.1 Materials declaration

For product sold into China after 1st March 2007, we comply with the “Administrative Measure on the Control of Pollution by Electronic Information Products”. In the first stage of this legislation, content of six hazardous materials has to be declared. The table below shows the required information.

組成名稱 Part Name	Toxic or hazardous substances and elements					
	鉛 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
Multicon VX-MOD	O	O	O	O	O	O
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006. X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.						

This is indicated by the product marking:

A.2 Recycling information

Nevion provides assistance to customers and recyclers through our web site http://www.nevion.com/. Please contact Nevion’s Customer Support for assistance with recycling if this site does not show the information you require.

Where it is not possible to return the product to Nevion or its agents for recycling, the following general information may be of assistance:

- Before attempting disassembly, ensure the product is completely disconnected from power and signal connections.
- All major parts are marked or labeled to show their material content.
- Depending on the date of manufacture, this product may contain lead in solder.
- Some circuit boards may contain battery-backed memory devices.

EC Declaration of Conformity

MANUFACTURER	Nevion Europe AS P.O. Box 1020, 3204 Sandefjord, Norway	
AUTHORIZED REPRESENTATIVE (Established within the EEA)	Not applicable	
MODEL NUMBER(S)	18463	
DESCRIPTION	Multicon VX-MOD	
DIRECTIVES this equipment complies with	LVD 73/23/EEC EMC 2004/108/EEC	
HARMONISED STANDARDS applied in order to verify compliance with Directive(s)	EN 55103-1:1996 EN 55103-2:1996 EN 60950-1:2006	
TEST REPORTS ISSUED BY	**Notified/Competent Body**	**Report no:**
	Nemko	<Report no>
TECHNICAL CONSTRUCTION FILE NO	Not applicable	
YEAR WHICH THE CE-MARK WAS AFFIXED	<Year>	
TEST AUTHORIZED SIGNATORY		
MANUFACTURER	**AUTHORIZED REPRESENTATIVE (Established within EEA)**	**Date of Issue**
		<date>
		Place of Issue
	Not applicable	Sandefjord, Norway

NETWORK ELECTRONICS AS
O.nr. 976 584 201 MVA

Name Thomas Øhrbom

Position QA Director, Nevion Europe
(authorized signature)